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10/680,366	10/06/2003	Jeffrey A. Nielsen	200310347	4652

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EXAMINER	
LAMBELET, LAWRENCE EMILE	

ART UNIT	PAPER NUMBER
1732	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	**Application No.** 10/680,366	**Applicant(s)** NIELSEN ET AL.	
	Examiner Lawrence Lambelet	**Art Unit** 1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _06 October 2003_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-46_ is/are pending in the application.

4a) Of the above claim(s) _29-46_ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-28_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _06 October 2003_ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-28, drawn to method of forming porous structures in Solid Freeform Fabrication, classified in class 264, subclass 497.

II. Claims 29-36, drawn to product by method of forming porous structures in Solid Freeform Fabrication, classified in class 428, subclass 304.4.

III. Claims 37-44, drawn to apparatus for forming porous structures by Solid Freeform Fabrication, classified in class 425, subclass 375.

IV. Claims 45-46, drawn to processor media, classified in class 700, subclass 119.

Inventions of Groups I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process, wherein the build material is deposited as a powder and sintered by heat.

Inventions of Groups 1 and III are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or

(2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus as claimed can be used to practice another and materially different process, wherein the support material is left in place forming a bi-material composite.

Inventions of Groups II and III are related as apparatus and product made. The inventions in this relationship are distinct if either or both of the following can be shown: (1) that the apparatus as claimed is not an obvious apparatus for making the product and the apparatus can be used for making a materially different product or (2) that the product as claimed can be made by another and materially different apparatus (MPEP § 806.05(g)). In this case the apparatus can be used for making a materially different product, wherein a bi-material composite is formed.

Inventions of Groups III and IV are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct if they do not overlap in scope and are not obvious variants, and if it is shown that at least one subcombination is separately usable. In the instant case, subcombination processor media has separate utility such as a data processing control for a stereolithography apparatus. See MPEP § 806.05(d).

Inventions of Groups I and IV and II and IV are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, the different inventions are method and processor media and product and processor media, respectively, wherein processor media is usable only with a computer device.

During a telephone conversation with Bradley Haymond on 7/17/2006 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-28. Affirmation of this election must be made by applicant in replying to this Office action. Claims 29-46 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Drawings

The drawings are objected to because reference character 805 is not shown in Fig 8A as recited in the specification. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities: The same term, "containment structure", is referred to with two different reference characters: 805 and 113. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6, 9-11, and 13-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Monkhouse et al (W.O. Publication 00/29202).

Monkhouse et al, hereafter "Monkhouse", discloses a method of producing porous structures with solid freeform fabrication (SFF), as recited in claims 1 and 14. Monkhouse teaches selectively depositing a water-soluble material (removable support) prior to depositing a pattern of binder onto an insoluble layer (build material), and subsequently dissolving the first material to produce controlled pores or channels. This is shown at lines 7-10 on page 14, 23-30 on page 15, and 1-4 on page 16.

Monkhouse teaches a dosage form having active and placebo ingredient regions produced by an SFF method at line 39 on page 12 and lines 1-3 on page 13. The placebo performs a non-removable support material function, as required by claim 2, in that it effectively isolates space within an active ingredient matrix.

Monkhouse teaches planarizing layers, as required by claim 3, and as found at lines 19-23 on page 9 with illustration in Fig. 1.

Monkhouse teaches means of solidifying a deposition (build material), including the application of heat, as required by claims 4 and 5. This is shown at lines 37-44 in column 7.

Monkhouse teaches that the insoluble material (build) follows the soluble (support) in order of preparation steps, as required by claim 6, and as shown at lines 23-25 on page 15.

Monkhouse teaches selective deposition of materials by 3D Printing (high-precision dispenser), as required by claims 9 and 13. Appropriate citation can be found at lines 22-29 on page 7 and 3-7 on page 8. The precision resides in a drop-on-demand print head.

Monkhouse teaches a staggering of microarchitectural channels throughout a device prepared in the manner of claim 1 above at lines 5-12 on page 16. This suggests voxels in both planar and vertical arrays, as required by claims 10 and 11.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 15-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Czernuszka et al (U.S. Patent Publication 2004/0258729).

Czernuszka et al, hereafter "Czernuszka", discloses a method of producing porous structures with SFF, as recited in claim 15. Czernuszka teaches depositing molten micro droplets (rapidly solidifying build material) to form a porous structure coupled by overlapping beads. This is shown in paragraphs [0007] and [0009] to [0011].

Czernuszka teaches disposing a property enhancing material, namely a collagen scaffolding (flexible), in the mold (porous configuration), as required by claims 16 and 17. Appropriate citation can be found in paragraph [0018].

Czernuszka teaches overhanging structure of the build material, as required by claim 18, in paragraph [0011].

Czernuszka teaches repeating layer depositions to form a 3D structure in paragraph [0011]. Such a structure would inherently have vertical and planar arrays of voxels, as required by claims 19 and 20.

Claims 21-26 are rejected under 35 U.S.C. 102(e) as being anticipated by Taboas et al (U.S. Patent Publication 2003/0006534)

Taboas et al, hereafter "Taboas", discloses a method of producing porous structures with SFF, as recited in claim 21. Taboas teaches fabrication of a mold (coupled containment structures) having porous regions and casting a material within (bulk build material). This is shown in paragraphs [0054], [0058], and [0065].

Taboas teaches forming the mold with 3D Printing, a method using ink jet drop-on-demand technology (high precision dispenser), as required by claim 22, and as shown in paragraph [0058]. It is known that this technology selectively deposits voxels in a layer configuration and builds successive layers into a 3D object. Vertical and planar arrays of voxels, as required by claims 23 and 24, are thus inherent in such a scheme. Inevitably, in such arrays, a bridging voxel will occur, such that a porous gap is spanned, as required by claim 26.

Taboas teaches that the build material is cast in paragraph [0065]. Casting, as opposed to printing, implies a low precision material dispenser, as required by claim 25.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Monkhouse, as applied to claims 1-6, 9-11, and 13-14 above, and further in view of Taboas.

Monkhouse teaches the method of claims 1-6, 9-11, and 13-14, as discussed above.

Monkhouse does not teach depositing build material with a low precision dispenser, as required by claim 12.

Taboas teaches that the build material is cast in paragraph [0065]. Casting, as opposed to printing, implies a low precision material dispenser.

Monkhouse and Taboas are combinable because they are concerned with a similar technical field, namely, scaffold fabrication. One of ordinary skill in the art at the time of the invention would have found it obvious to include in the method of Monkhouse the bulk deposition method, as taught by Taboas, and would have been motivated to do so avoid time-consuming discrete deposition.

Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Monkhouse, as applied to claims 1-6, 9-11, and 13-14 above, and further in view of Schmidt (U.S. Patent 6,228,437).

Monkhouse teaches the method of claims 1-6, 9-11, and 13-14, as discussed above.

Monkhouse does not teach infiltrating pores with a property enhancing material, as required by claim 7, or in specific terms, a material of high toughness, as required by claim 8.

Schmidt teaches infiltrating an SFF porous structure with a pre-ceramic polymer thereby enhancing the mechanical strength (toughness) of the structure. This is shown at lines 62-67 in column 2 and lines 1-13 in column 3.

Monkhouse and Schmidt are combinable because they are concerned with a similar technical field, namely, solid freeform fabrication . One of ordinary skill in the art at the time of the invention would have found it obvious to include in the method of Monkhouse the property enhancing technique of Schmidt, and would have been motivated to do so for robustness of structure.

Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taboas, as applied to claims 21-26 above, and further in view of Schmidt.

Taboas teaches the method of claims 21-26, as discussed above.

Taboas does not teach infiltrating pores with a property enhancing material, as required by claim 27, or specifically, a material of high toughness, as required by claim 28.

Schmidt teaches infiltrating an SFF porous structure with a pre-ceramic polymer thereby enhancing the mechanical strength (toughness) of the structure. This is shown at lines 62-67 in column 2 and lines 1-13 in column 3.

Taboas and Schmidt are combinable because they are concerned with a similar technical field, namely, solid freeform fabrication. One of ordinary skill in the art at the time of the invention would have found it obvious to include in the method of Taboas the property enhancing technique of Schmidt, and would have been motivated to do so for robustness of structure.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following documents are cited to further show the state of the art with regard to fabricating porous structures:

U.S. Patent 5518680 to Cima et al

U.S. Patent Publication 2004/0081573 to Newell

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence Lambelet whose telephone number is 571-272-1713. The examiner can normally be reached on 8 am-4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LEL

CHRISTINA JOHNSON
PRIMARY EXAMINER
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